

- 34 -

SOME OBSERVATIONS ON THE SABALO FISHERY IN THE PHILIPPINES

by

Porfirio R. Manacop, Sr.*

Abstract

This paper is a compilation of observations on the catch of both the sea and lacustrine sabalo which were caught by existing fishing methods and gear. It also presents a study of the fishing methods and gear used including an analysis of the catch in terms of quantity, size and weight of fish, sex ratio, and size at sexual maturity.

Introduction

The term "sabalo" refers to the maturing and adult stages of milkfish, Chanos chanos (Forsk.) inhabiting both freshwater and marine environments. In freshwater lakes they grow to almost early maturing stage and after about two or three years, they migrate to the sea in order to reach sexual maturity and spawn. In freshwater lakes like Lake Naujan in Oriental Mindoro, a sizable quantity of sabalo is being caught annually to form a distinct fishery. In the sea, however, the quantity taken by commercial fishing gear represents only an incidental part of the whole catch.

However, the catching of the sea sabalo is prohibited, except for scientific purposes, under existing fishery regulations (Fisheries Administrative Order No. 25). This regulation has been enforced since August 5, 1949 by the Secretary of Agriculture and Natural Resources to protect the multi-million peso bangos fry industry of the country (Appendix I). The stocking of bangos in freshwater lakes both in pens and in natural waters has been successfully undertaken by the Bureau of Fisheries and Aquatic Resources (BFAR) in Laguna de Bay and Lake Naujan.

Nature and Extent of Sabalo Catch

Table 1 shows the compiled data on sabalo catch as gathered from various references and sources in the Philippines. The data presented

*Research Coordinator, Aquaculture Department, Southeast Asian Fisheries Development Center

here are by no means complete; however, additional information are being monitored from various fishing centers in cooperation with the BFAR and the IDRC-SEAFDEC Integrated Milkfish Project. The Inland Fisheries Project has also been gathering biological catch data since 1973 in Libertad and Hamtic, Antique, including Iloilo province.

There are two sources of catch: (1) the marine sabalo and (2) the lacustrine or catadromous sabalo. The marine sabalo includes those normally inhabiting the sea environment and usually caught by fishing gear along the coastal areas. The lacustrine sabalo, on the other hand, includes those taken by barrier traps especially constructed across river outlets of some freshwater lakes in the Philippines. They have been landed in fairly commercial quantities in Butas River of Lake Naujan, Oriental Mindoro; Pansipit River of Lake Taal, Batangas Province; Bicol River of Lake Bato in Camarines Sur; and in Jabonga-Tubay River of Lake Mainit, Surigao-Agusan Provinces.

Fishing season. In the reported fishing centers, the fishing season of the sea sabalo extends from March to May with the peak of catching in April. The season of catching of the lacustrine sabalo as reported in Lake Naujan is year-round with two peaks of migration to the sea during March and April and from September to December (Table 2). It is interesting to note that the peak fishing season coincides with the peak of the bangos fry season in most parts of the country. Equally interesting is the occurrence of a "lean season" of the fry from the Bicol and Visayan regions to the Sulu Archipelago from July to October. In Luzon, Mindoro and adjoining Lubang Islands, there is no reported "lean season" which could be an indication that the spawning season of the sabalo extends towards the lower latitudes of the country.

Quantity of catch. The highest record of sabalo catch per unit of fishing gear for one year has been reported in the amount of 22,257 pieces in 1961 (Table 2). These were taken by barrier fish trap in Butas River, Naujan, Oriental Mindoro (Delmendo and Angeles, 1968). This unit catch was followed by 105 sabalo taken from one otoshi-ami in Pandan, Antique (IDRC-SEAFDEC, 1975); 78 by gill net in Lake Naujan (Angeles, 1968); 20 to 30 by handling in Opol, Oriental Misamis (Manacop, 1940). One sabalo was accidentally taken by an otter trawl in Ilog, Occidental Negros. As to total catch of the sea sabalo by fishing gear and by fishing center, the highest catch was reported in the amount of 3,418 pieces by fish corrals in Moron, Bataan, followed by 500 to 1,000 pieces by the same kind of fishing gear in Bagac, Bataan (Kafuku, 1960).

Size and weight of fish. The size of the individual fish appears on the average to be longer by those taken by fish corrals in Hamtic, Antique and Tigbauan, Iloilo than those by otoshi-ami, gill nets and barrier fish traps in other parts of the country. However, the corresponding weight of the individual fish as taken by various fishing gears under different situations also varies quite distinctly. The sea sabalo taken by fish corral in Hamtic, Antique and Tigbauan, Iloilo averaged 97.2 cm in total length with their corresponding weight of 7.0 kg (UP College of Fisheries, 1974); by gill net in Naujan 89.7 cm, 7.0 kg (Angeles, 1968); by otoshi-ami in Pandan, 93.2 cm, 6.7 kg (IDRC-SEAFDEC, 1975); by barrier fish trap in Naujan 65 cm, 3.5 kg (Delmendo and Angeles, 1968). This indicates that the lacustrine sabalo is heavier than the sea sabalo on length-weight ratio.

Sex ratio of fish. The sex ratio of the sabalo catch by kind of fishing gear appears to vary with reference to the fishing center. The number of males predominate in the otoshi-ami catch in Pandan and gill net in Naujan, including those taken by fish corral in Hamtic, Antique.

However, in the catch of sabalo by fish corral in Tigbauan (1973-74), the number of females predominate -- 55% were females and 45% males, including four immature fish. In the case of the lacustrine sabalo, the sex ratio has not been determined except that they are all reported to be sexually immature.

Size at sexual maturity. From observations gathered from various sources, the minimum size at sexual maturity of sabalo is estimated at about 85 cm total length for the females and about 75 cm for the males.

Fishing Gear and Methods Used

Fishing gears in which sabalo forms an incidental part of the catch includes the deep water fish corral, the floating box net (otoshi-ami), the gill net, the barrier fish trap, and the handline.

1. Deep-water Fish Corral (Fig. 1, Table 1)

A typical deep-water fish corral is a type of fish trap made of bamboo poles and mattings which are set at about 10 to 15 m depth of water at strategic site along the sea coast. It is constructed in series of three enclosures or chambers, flanked by two wings and a prolonged leader toward the shoreline.

These traps are set at specific fishing zones within three nautical miles of the municipal waters. In Antique the season of

operation starts in December and extends until the end of June to coincide with the calm months of the year.

The gear is maintained and operated by ten to twelve men. Every morning between 4:00 and 6:00 o'clock, the catch which concentrates at the terminal pound is hauled in with a seine net and marketed in fresh or iced condition depending upon the distance from the market. The catch profit is shared on a 50:50 basis between the owner and the fishermen after subtracting the initial investment for materials and other incidental expenses, including the local concession license fee.

The total investment for a typical corral is estimated at ₱21,000 under Antique condition. (See Table 1). At Pandan, however, the cost is about ₱10,000 to ₱15,000. The cost for maintenance and repair during the season ranges from ₱3,000 to ₱5,000 per fish corral.

2. Floating Trap or Otoshi-ami Net (Fig. 2, Table 3)

The otoshi-ami is a comparatively new fishing gear introduced from Japan sometime in 1965 in Palawan and Mindoro. It is generally made of nylon netting and is a distinct improvement over the local deep-water fish corral which is made of bamboo. Because of heavy capital investment involved, it could not be generally adopted in many parts of the country. In 1975 there were only five operating units distributed as follows: three units otoshi-ami nets, one in Davao and one in Quezon province. These otoshi-ami nets form part of the Japanese Reparation goods furnished by the Japanese Government. This pilot fishing project is being operated jointly between the private sector and the BFAR.

The life span of this fishing gear is about five to seven years with regular maintenance. It is estimated at about ₱500,000 per set of fishing gear, or 20 times more than the average deep-water baklad. It is operated by 28 fishermen who are paid on daily basis from ₱6.00 to ₱8.00 depending on their skill. The catch is hauled two to three times daily depending on the amount of impounded fish.

The gear consists of six basic parts, namely: catching pound; inner slope; outer slope; playground; leader; and framework and anchorage (floats, sandbags and rope). The supporting operating equipment consists of: two bamboo rafts; two skiffs; one service boat; one fish carrier; and one cold storage.

The gear is operated seasonally from November through June. It is dismantled after the season, cleaned of marine growth (barnacles, oysters, sponges, etc.), repaired and stored for the next season. It is possible that in sheltered coves and bays, it can be effectively

operated throughout the year. However, in order to maintain its catching efficiency, various parts of the net proper have to be dismantled for regular monthly cleaning of marine growth.

3. Gill Net

A typical gill net intended for tuna and skipjack also catches sabalo during the fishing season which extends from March to June. These are the calm months of the year (Northeast monsoon period) along the west coast of the country.

A typical net measures from 300 to 400 m long and 15 m deep hung measure and it is made entirely of nylon netting with 150 mm mesh, stretched, 210/18 to 21 thread. The floatline is provided with plastic floats and the leadline with lead sinkers or brass rings. A set of gill net with the above specification costs about ₱2,000 exclusive of the fishing pump boat.

The gear is operated by two to three men and the sharing system is normally 60% to the owner and 40% to the fishermen after deducting operating expenses. If the operator is also the owner, then he gets a proportionate share from the 40% share of the fishermen.

4. Handline

The handline designed for sabalo, according to information, was developed by fishermen from Bohol province and was observed to be successfully used in Opol, Or. Misamis in 1938-39. Information has it also that this special type of gear for sabalo has been adopted in Siquijor Island and in Bugasong, Antique province. The gear can be used throughout the year when weather condition permits.

A typical handline outfit consists of a one-man-operated non-motorized dugout, a 500 c.p. incandescent lamp and a set of handline. The handline is made of monofilament of about 100 meters long with a tensile strength of 150 to 200 lbs test. At the distal end, a piano wire of 1.5 m long is connected to a No. 6 Mustad hook.

The gear is operated during the dark of the moon, about 18 to 20 days a month. In actual fishing, a handline is set between 26 to 30 fathoms at the edge of a shoal reef. A set of line and a dugout cost about ₱1,000 including the pumpboat. The special bait used consists of a species of jelly fish which is used alive, with the hook attached to its dorsal part. The jelly fish has not been identified as yet.

5. Barrier Fish Trap

This fishing gear is a specialized type of fish corral which is set across river outlets of freshwater lakes in order to catch seaward migrating catadromous species of fish including sabalo. The setting of barrier traps is operated under municipal concession which is granted to the highest bidder for a period of three to five years.

A typical barrier fish trap is made of bamboo poles and mattings and consists of two wings, a playground, an ante-chamber, and a terminal pound. The gear is normally set at the deepest portion of the river with gate provisions for passage of navigating boats up and down the lake.

The gear is usually operated and maintained by 10 to 12 men. The catch is seined every morning in the playground in order to concentrate the fish in the terminal pound. Here the catch is hauled and kept in a live cage while waiting for shipment to market. A typical barrier trap costs from ₱15,000 to ₱20,000 depending upon the size and depth of the river outlet.

The fishermen are usually paid on salary basis at ₱8.00 to ₱15.00 per day; the divers, however, are given the maximum rate per day.

Summary and Conclusion

1. Sabalo catch is only an incidental part of the catch of the fishing gear used in various parts of the Philippines; hence, there is no commercial fishery to speak of except the lacustrine sabalo being caught by barrier trap set in the outlet of Lake Naujan.

2. Similar sabalo fishery has also been reported in Pansipit River of Lake Taal, Batangas; Bicol River of Lake Bato, Camarines Sur; and Jabonga-Tubay River, Lake Mainit, Surigao-Agusan provinces.

2. The common fishing gear used in catching sabalo include: (1) deep-water fish corral; (2) floating trap or otoshi-ami; (3) gill net; (4) handlines; and (5) barrier traps. Of these fishing gears, the barrier trap and the otoshi-ami are the main catches of sabalo per unit of gear or effort.

3. The main fishing season of sea sabalo which almost coincides with the catching season of the Chanos fry extends from March to June with the peak occurring in April.

4. As to sex composition of the catch of sea sabalo by various

fishing gear used and by fishing centers reporting, there appears to be a general preponderance of males over the females.

6. The minimum size at sexual maturity is estimated at 85 cm in total length for the females and about 75 cm for the males.

7. All the lacustrine sabalo taken in by barrier traps in Butas River, Oriental Mindoro, are reported to be all sexually immature.

Republic of the Philippines
Department of Agriculture and Natural Resources
OFFICE OF THE SECRETARY
Manila

FISHERIES ADMINISTRATIVE)

ORDER NO. 25

August 5, 1949

SUBJECT: Regulations for the Conservation of "Sabalo"
(Full-grown Bangos or Milkfish) and for the
Prohibition of the Exportation to Foreign
Countries of "Kawag-Kawag" (Bangos or Milk-
fish Fry) and "Hatirin" (Bangos Fingerlings)

Pursuant to the provisions of Section 79(b) of the Administrative Code of Sections 4, 7, 13 and 19 of Act No. 4003, entitled "An Act to Amend and Compile the Laws Relating to Fish and Other Aquatic Products of the Philippine Islands and for Other Purposes", as amended by Commonwealth Act No. 471 and for the protection and conservation of certain species of fish commonly known as "Sabalo" or full-grown bangos (Milkfish) and scientifically known as Chanos chanos (Forsk.), and prohibition of the exportation to foreign countries of "kawag-kawag" or bangos (Milkfish) fry and of "hatirin" or bangos (Milkfish) fingerlings, the following rules and regulations are hereby promulgated for the information and guidance of all concerned:

1. Definitions. -- For the purpose of this Administrative Order, the following terms as used herein shall be construed as follows:

- (a) "Possession" means actual or constructive possession of any control of the things referred to.
- (b) "Sell" or "Sale" includes bartering, exchanging, or offering or exposing for sale.
- (c) "Transport" or "transportation" means carrying or moving or causing to be carried or moved.
- (d) "Taking" or "carrying" includes pursuing, shooting, killing, capturing, trapping, snaring and netting fish and comprises any such act as disturbing, wounding, stupefying or placing, setting, drawing or using any net or other means or device commonly used to catch or collect fish or other aquatic animals, whether they

result in the catching or not and includes every attempt to catch and every act of assistance to every other person taking or attempting to take or collect fish or other aquatic animals: Provided that whenever taking is authorized by law, it refers to taking by lawful means or in a lawful manner.

- (e) "Sabalo" or full grown bangos shall mean bangos which are sexually mature, in spawning condition, or carrying ripe eggs and milt.
- (f) "Kawag-kawag" or bangos fry means the very tiny transparent big-eyed bangos, measuring from one to two centimeters in length, which swim in vast shoals near the shoreline of shallow sandy coasts and which enter estuaries and tidal creeks.
- (g) "Hatirin" or bangos fingerlings means young bangos of fingerlings size, usually beyond the fry stage up to 10 centimeters long, grown in the nursery ponds.

2. Restrictions. --

- (a) No fish corrals, traps, or any device, shall be set or placed across any river, or stream, which connects an inland body of water with the sea unless regulated by or under authority of the Secretary of Agriculture and Natural Resources, to allow enough space for the free passage of full-grown bangos (Sabalo) to enable them to reach the spawning or breeding grounds.
- (b) No fish corral, fish trap, or "baklad" shall be constructed within 200 meters of another in marine fisheries, or 100 meters in freshwater fisheries, unless they belong to the same license, but in no case shall they be less than 60 meters apart.

3. Prohibitions. --

- (a) It shall be illegal during the period from February 1 to July 31, inclusive, of each year, for any person, association, or corporation to catch, or cause to be caught, in Philippine territorial and inland waters, or purchase, sell, offer, or expose for sale, full-grown bangos (Sabalo) measuring more than sixty (60) centimeters in length from the tip of the mouth

to the extreme end of the caudal fin or tail, dead or alive, or to have in possession or in storage, the same, unless exempted as provided in Section 4 of this Administrative Order.

4. Exemptions. --

- (a) The Secretary of Agriculture and Natural Resources may grant, free of charge, to any person, association, institution or corporation, of good repute, a permit to catch, or cause to be caught, bangos of any size and age otherwise prohibited in this Administrative Order, provided they are used exclusively for scientific or educational purposes and subject to such conditions and limitations as the Secretary of Agriculture and Natural Resources may prescribe for the proper conservation of this species.
- (b) Persons catching bangos of any size and age under the aforesaid licenses but found using them for purposes other than those specified in the licenses or permits shall be subject to the same penalty as if no permit has ever been granted.

5. Enforcement. --

For the purpose of enforcing the provisions of this Administrative Order and of such regulations as may hereafter be promulgated, fish wardens and inspectors, members of the Philippine Naval Patrol, members of the Philippine Constabulary and Philippine Army, members of the provincial, city, municipal district police, members of the secret service force, harbor police and inspectors, guards and wharfingers of the Bureau of Customs, Internal Revenue officers and agents, officers of Coast Guard cutters, lighthouse keepers, and such other competent officials, employees or persons as may be designated in writing by the Secretary of Agriculture and Natural Resources, are hereby made deputies by said Department Head and empowered:

- (a) To ascertain whether or not persons found engaged in fishing for "sabalo" or full-grown bangos or bangos fry are duly provided with licenses or permits required in this Administrative Order.
- (b) To arrest any person found committing, or attempting to commit, an offense against the

provisions of this Administrative Order.

- (c) To seize, or confiscate, when deemed necessary for evidence or for such purposes as the Secretary of Agriculture and Natural Resources, or his duly authorized representative, may consider advisable any fishing gear or apparatus or equipment used, or which may be used, to catch, kill or take, any fish and fish caught or killed or otherwise taken or found in the possession of any person, for export or any other purpose, in violation of this Administrative Order; and
- (d) To file the necessary action in court for any violation of this Administrative Order and otherwise report said violation to the Secretary of Agriculture and Natural Resources or to the Director of Fisheries.

6. Penalty. --

Any violation of the provisions of this Administrative Order shall subject the offender to fine of not more than Two Hundred Pesos (P200.00), or imprisonment for not more than six (6) months, or both in the discretion of the court, as provided for in Section 83 of Act No. 4003, as amended by Commonwealth Act No. 471.

7. Repealing Provision. --

All administrative orders and regulations, or parts thereof, inconsistent with the provisions of this Administrative Order, are hereby revoked.

8. Effectivity. --

This Administrative Order shall take effect sixty (60) days after its publication in the Official Gazette.

(Sgd.) PLACIDO L. MAPA
Secretary of Agriculture and
Natural Resources

APPROVED:

By authority of the President:

(Sgd.) TEODORO EVANGELISTA
Executive Secretary

(Published in the Official Gazette,
October, 1949).

A true copy - 27 June 1975

TABLE 1
CATCH RECORD OF SABALO (Chanos chanos Forskal)
BY LOCALITY, BY FISHING GEAR AND BY FISHING SEASON^{1/}

Item	Locality	Year	Fishing Gear	Fishing Season	Catch			Reported by	Remarks
					Number	Weight	Length		
1	Bagac, Bataan	1940	Fish Corral	March-May	500-1,000	Na. ^{2/}	Na. ^{2/}	D. Buñag 1948	Peak of catching, April and May
2	Hamtic, Antique	1973-1974	-ditto-	-ditto-	9/gear	5.0-7.0	86.8-97.0	Inland Fish. Proj.	Peak of catching, May. All males.
3	Hamtic, Antique	1975	-ditto-	April-May	11	5.4-9.25	86.0-107	SEAFDEC	5 females, 6 males Total catch per season/gear - 14 3 escaped from trap
4	Ilog, Neg. Occ.	Mar. 7 1975	Otter-trammel trawl	March-May	One (1)	9.1	92.0	SEAFDEC	Accidentally taken by trawl, 10-15 fathoms, with maturing gonads.

^{1/}Compiled catch data of sabalo from various sources in the Philippines (1940 to 1975).

^{2/}Data not available.

Item	Locality	Year	Fishing Gear	Fishing Season	Catch			Reported by	Remarks
					Number	Weight	Length		
5	Morong, Bataan	1940	Ftsh-corral	March-May	3,418 (total)	Na.	Na.	T. Kafuku	
6	Naujan Bay, Mindoro	1967-1969	Gill net	April-June	78/gear	5.0-7.0 (males) 5.5-9.0 (females)	82.5-94.0 cm. (males) 85.0-97.0 (females)	H.G. Angeles BFAR	37 males & 21 females, 4 immature males and 3 immature females. The rest are sexually mature.
7	Opol, Or. Misamis	1939	Hand-line	March-May	20-30/gear	Na.	Na.	Personal record (Manacop)	Stripped and fertilized eggs, hatched in 30 hours in petri dish. Taken with the aid of 30 c.p. Petromax lamp, using live jelly fish as bait.
8	Pandan	1975	Otoshi-ami	March-May	105	4.91-860	86.1-100.3	SEAFDEC	34% female, 64% male; peak catch, May.

Item	Locality	Year	Fishing Gear	Fishing Season	Catch			Reported by	Remarks
					Number	Weight	Length		
9	Tigbauan, Iloilo	1973-1974	Fish Corral	March-May	15	4.30-8.37	86.1-103.3	Inland Fish Project	All males; peak catch, May.
10	Tigbauan, Iloilo	-ditto-	-ditto-	-ditto-	15	4.94-8.90	89.1-107.6	-ditto-	All females; peak catch, May.
11	Tigbauan, Iloilo	-ditto-	-ditto-	-ditto-	4	2.66-4.32	73 -84.1	-ditto-	Immature stages.
12	Naujan, Mindoro	1958-1967	River Fish Corral	Year round	12,486	3.0 -4.0	60 - 70	Delmendo & Angeles	Immature stages; peak, March.

TABLE 2

BILL OF MATERIALS FOR A
TYPICAL FISH CORRAL FOR SABALO

Materials

Bamboos - 2,000 pcs. at ₱3.50 @-----	₱ 8,650
Rattan tis -	
(Balaba) 25,000 pcs. at ₱0.21 @-----	5,250
(Empague) 15,000 pcs. at ₱0.20 @-----	3,000
Fabrication of bamboo slats -	
2.40/3.00 dimensions - 80 units -----	1,500
Bamboo post erection (meal allowance) ----	1,000
Rental for net and banca -----	500
Contingencies -----	1,000
Total -----	<u>₱20,900</u>
Say -----	<u>₱21,000</u>

TABLE 3

PROSPECTUS FOR 35-METER LAMBAKLAD
(As of August 1974)

I.	TOTAL CAPITALIZATION -----	₱317,739.79
II.	CAPITALIZATION (Equipment)	
	A. Net materials and accessories ----	₱302,739.79
	B. Motorboat, 48 ft. with outrigger (Toyota - 7R) -----	5,000.00
	C. Flat boat (5m x 2m) 2 pcs. each ₱570.00 -----	1,500.00
	D. Two (2) units bamboo raft -----	1,500.00
	E. Building (Fishermen's Quarter and Hardware) -----	5,000.00
	F. Concrete tank -----	2,000.00
III.	OPERATING EXPENSES -----	179,442.32
	A. Gasoline, spare parts, maintenance -----	8,000.00
	B. Fishing Right <u>1</u> / -----	15,000.00
	C. Fishermen 20 x 8 x 210 -----	33,600.00
	D. Master Fisherman 2 x 10 x 210 --	4,200.00
	E. Miscellaneous 10% (fishing operation) -----	6,080.00
	F. Interest -----	46,034.37
	G. Depreciation -----	60,447.95
	H. Miscellaneous 10% (sundries) -----	6,080.00
IV.	GROSS SALES	
	At 15 tons/month x 6 months x 3,000	270,000.00
	Less total operating expenses -----	<u>179,442.32</u>
	NET PROFIT/6 MONTHS -----	<u>₱ 90,557.68</u>

1/ Fee for fishing right depends on municipality.

TABLE 3-A

COST ESTIMATE FOR 35-36 METER OTOSHI-AMI

A. CATCHING POUND:

1. Netting 3" mesh, Nylon 210d/30 - 260,800 m-mesh at ₱2,292.00/10,000 m-mesh -----	₱59,775.36
2. Netting 2" mesh, Nylon 210d/30 - 69,500 m-mesh at ₱2,510.00/10,000 m-mesh -----	17,514.00
3. Netting 1" mesh, Nylon 210d/30 - 20,300 m-mesh at ₱3,672.00/10,000 m-mesh -----	7,454.16
4. Rope-floatline & hauling rope, poly 3/4" - 485 meter at ₱690/coil (200 m) -----	1,673.25
5. Rope-hanging ropes & riblines, poly 3/8" - 1,310 meters at ₱490.00/coil (200 m) -----	3,209.50
6. Rope, Norsal ropes, poly 1/2 - (400 m) at ₱230.00/coil -----	460.00
Twine for assembling, Nylon 210d/30-41, 450 m (33 kgs.) at ₱70.00/kg. -----	2,310.00
Lead weight with the sinking capacity of nylon 3/8" hole diameter 75 kgs. at ₱5.00/kg. -----	375.00
<hr/>	
SUB-TOTAL FOR "A" --	<u>₱92,771.27</u>

B. INNER SLOPE:

1. Netting 3" mesh, Nylon 210d/30-20 - 20,500 m-mesh at ₱2,292.00/10,000 mesh -----	₱ 4,698.60
2. Ropes-floatline & head, poly 1/2" 77 m at ₱230.00/coil (200 m) -----	88.55
3. Ropes - hanging ropes poly 3/8" 189 m at ₱460.00/coil (200 m) -----	414.00
4. Ropes - Norsal ropes, poly 1/2" 85 m at ₱230/coil (200 m) -----	97.75
Twine for assembling, nylon 210d/30 - 2,675 m (2.2 kg.) at ₱70.00/kg. -----	154.00
Lead weight, @1/2" hole 1.3 kgs. at ₱5.00/kg. -----	6.50
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SUB-TOTAL FOR "B" --	<u>₱ 5,459.40</u>

TABLE 3-A (cont'd.)

C. OUTER SLOPE:

1. Netting 5" mesh Nylon 210d/54 - 93,000 m-mesh at ₱4,400/10,000 m-mesh -----	₱40,920.00
2. Ropes - floatline, leadline, hauling rope and vertical line poly 3/4" - 65 m at ₱690.00 per coil (200 m) -----	2,242.50
3. Ropes - hanging line poly E 3/8" - 460 m at ₱460.00/coil (200 m) -----	1,058.00
4. Ropes - Norsal rope poly E 1/2" - 155 m at ₱230.00 per coil (200 m) -----	178.25
Twine for assembling nylon 210d/54 - 10,700 m (14.2 kgs.) at ₱70.00/kg. -----	994.00
Lead weight, @with 3/4" hole at ₱5.00 -----	317.00
SUB-TOTAL FOR "C" --	₱45,709.75
TOTAL -----	<u>₱143,657.14</u>
TOTAL BROUGHT FORWARD ---	<u>₱143,657.14</u>

D. PLAYGROUND:

1. Netting 5" mesh nylon 210d/54 142,000 m-mesh at ₱4,400.00/10,000 m-mesh -----	₱62,480.00
2. Ropes - floatline, leadline, vertical line poly E 2/4" - 320 m at ₱690.00/coil (200 m)	1,104.00
3. Ropes - hanging line & ribline poly E 3/8" 1,030 m at ₱460.00/coil (200 m) -----	2,369.00
4. Ropes - Norsal ropes, poly E 1/2" 270 m at ₱230.00/coil (200 m) -----	310.50
Twine for assembling, nylon 210d/54-16, 250 meters (232 kgs.) at ₱7.00/kg. -----	1,624.00
Lead weight each with 3/4" hole at 4.8 kgs. at ₱5.00/kg: -----	24.00
SUB-TOTAL FOR "D" --	<u>₱67,911.50</u>

TABLE 3-A (cont'd.)

E. LEADER:

1. Netting 2-ft. mesh poly #6 E, 300/m dia. 24,000 m-mesh at ₱16.40/coil (200 m) 48,000 m -----	₱3,936.00
2. Ropes for floatline & leadline poly 3/4" 705 m at ₱690.00/coil (200 m) -----	2,432.25
3. Ropes vertical line, poly E 3/8" 50 m at ₱460.00/coil (200 m) -----	115.00
4. Ropes - Norsal rope poly E 1/2" 100 m at ₱230.00/coil (200 m) -----	115.00
Twine for assembling poly E 300/m 2,500 (13.75 kgs.) -----	962.50
Lead weight each with 3/4" hole 55 kgs. at ₱5.00/kg. -----	275.00
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SUB-TOTAL FOR "E" --	<u>₱7,835.75</u>

F. FRAMEWORK & ANCHORAGE:

1. Sand bags, poly - 4,000 pcs. at ₱1.80 (2nd hand) -----	₱ 7,200.00
2. Rope for tying sand bags, film rope or soft twist poly E 500/m 100,000 m at ₱10.50/coil (200 m) -----	5,250.00
3. Rope - bridle of anchor line poly E or P 14 m/m 2,400 at ₱1,250.00/coil (200 m) -----	15,000.00
4. Rope-intermediate bridle poly E or P 18 m/m 300 at ₱38.00/coil -----	483.00
5. Rope - anchor line OR of PP 24 m/m 900 m at ₱428.00/coil (200 m) -----	1,926.00
6. Rope anchor line PE or PP 18 m/m 3,000 m at ₱322.00/coil (200 m) -----	4,830.00
7. Rope body and leader, wire cable 3/4" 1,150 m at ₱10.50/ft. -----	39,606.00
8. Rope body PE or PP 24 m/m 100 m at ₱428.00/coil (200 m) -----	214.00
9. Rope grommet for attachment of secondary anchor line PE or PP 18 m/m at ₱322.00/coil (200 m) -----	201.25
10. Thimble, 3/4" - 50 pcs. at ₱1.20/pc. -----	95.00

TABLE 3-A)(cont'd.)

11. Shackle, 3/4" - 86 pcs. at P26.00/pc. -----	P 201.25
12. Old bicycle tire, 224 pcs. at P1.50/pc. -----	95.00
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SUB-TOTAL FOR "F" --	<u>P 77,377.25</u>
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TOTAL BROUGHT FORWARD ---	<u>P296,781.64</u>

G. FLOATING:

1. Buoy steel, 1.75 ton buoyancy 2 pcs. at P45,325.00/each -----	P 90,650.00
2. Buoy steel, 2.5 ton buoyancy 1 pc. at P90,652.00 -----	90,652.00
3. Glass float - 1 1/2 ft. dia. - 150 pcs.	
4. Glass float - 1 ft. dia. - 70 pcs.	
5. Glass float - 6" dia. - 180 pcs.	
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SUB-TOTAL FOR "G" --	<u>P181,302.00</u>
	<hr/>
GRAND TOTAL -----	<u>P478,083.64</u>

NOTE: Netting and twine are treated with texacoat.
Prices are per August 1974.

Materials not available in the country - no price.

(Excerpt from unpublished study of the Bureau of
Fisheries and Aquatic Resources).

FIGURE 1

DIAGRAM OF A TYPICAL FISH CANAL
(not drawn to scale)

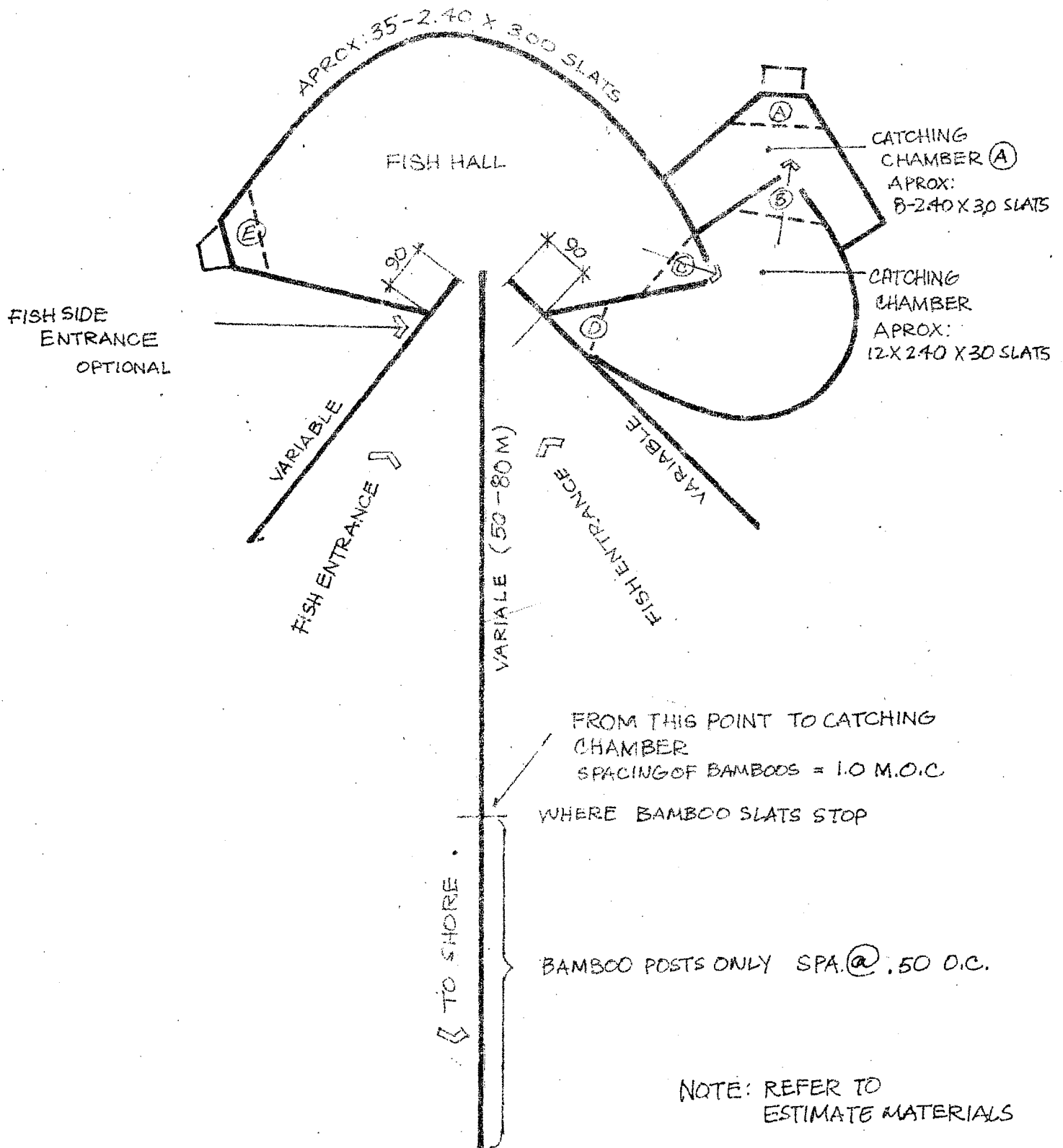


FIGURE 2

DIAGRAM OF A 35-METER OTOSHI-AMI NET
(not drawn to scale)

